REMARKS

In the office action, claims 21-34 have been rejected under 35 U.S.C. §103. In response, Applicants have added new claim 35 and provide the herein remarks. Claims 21-35 are currently pending. Reconsideration is respectfully requested.

Rejections Under §103

Claims 21-26 have been rejected under §103 as being unpatentable over Seppala et al. in view of Hovenkamp-Hermelink et al. and Batelaan et al. The Examiner recognizes that Seppala does not teach (1) starches from a plant that has been genetically modified; (2) a process wherein the starch is hydrophobized via amidation; and (3) attaching the hydrophobic group in the presence of a surfactant. The Examiner contends that these deficiencies are taught by Hovenkamp et al. and Bathelaan et al. Applicant respectfully disagrees.

Hovenkamp-Hermelink et al. disclose amylose-free starch from mutant potatoes. The amylose-free potato mutant of Hovenkamp et al. was isolated after screening 12,000 minitubers. Nowhere in Hovenkamp is there any disclosure or suggestion to prepare hydrophobic starch derivates according to the present invention. Importantly, there is no disclosure or suggestion that such a hydrophobic amylopectin root or tuber starch would possess the unexpected properties that Applicants have discovered.

Batelaan et al. disclose methods for amidation of a material having at least one carboxyl-containing polysaccharide (see page 3, line 31 to page 4, line 1). The carboxyl-containing polysaccharide includes carboxyl methyl starch. However, nowhere is there any disclosure or suggestion to utilize root or tuber starches from modified plants according to the present invention.

Importantly, there is no disclosure or suggestion in Bathelaan et al. that utilization of root or tuber starches according to the present invention would produce a hydrophobic amylopectin starch possessing the unexpected properties that Applicants have discovered.

Claim 27 (a hydrophobized amylopectin starch product) has been rejected under 35 U.S.C. §103(a) as being unpatentable over Seppala et al. in view of Hovenkamp-Hermelink et al. Neither Seppala et al. nor Hovenkamp et al., nor a combination of the two, disclose or suggest a hydrophobized amylopectin root or tuber starch product according to the present invention.

Seppala et al. merely disclose hydrophobized natural starches containing up to 100% amylopectin, while Hovenkamp et al. disclose the isolation of an amylose-free potato mutant after screening 12,000 minitubers. According to the Examiner, it would have been obvious to one of ordinary skill in the art to use the starch taught by Hovenkamp in the hydrophobization process of Seppala et al. For the reasons discussed below, Applicants respectfully disagree.

Claim 28 (a method for thickening a starch) has been rejected under 35 U.S.C. §103(a) as being unpatentable over Seppala et al. in view of Hovenkamp-Hermelink et al and Bathelaan et al. Neither Seppala et al. nor Hovenkamp et al., nor Batelaan, nor a combination of the three, disclose a hydrophobized amylopectin starch product according to the present invention.

The Examiner contends that it would have been obvious to use the claimed hydrophobic starches as thickening agents because Bathelaan allegedly discloses that hydrophobic polysaccharides exhibit improved viscosity. For the reasons discussed below, Applicants respectfully disagree.

Seppala et al. disclose an industrial process for thermoplasticizing a natural starch. The industrial process of Seppala et al. utilizes an intermediate step of hydrophobizing a

natural starch. Applicants strongly urge the Examiner to consider that one of ordinary skill in the art after reading the industrial process disclosed by Seppala et al. would not think to use the rare mutant potato of Hovenkamp et al. Especially because doing so would require the extra step of screening 12,000 minitubers in order to obtain the mutant potato.

Interestingly, the mutant potato isolated by Hovenkamp et al. was known for a decade before the patent application of Seppala et al. was filed, yet Seppala et al. makes no mention or suggestion to utilize amylopectin potato starch in its process.

Furthermore, Batelaan discloses a process only suitable for polysaccharides, which posses very distinct properties and behaviors as compared to the amylopectin root or tuber starches in the present invention.

Without the impermissible use of hindsight, it is not conceivable how one of ordinary skill would have combined the teachings of Seppala et al. with Hovenkamp et al. and optionally with Batelaan et al. and arrived at the present invention.

In the office action, the Examiner has addressed the arguments previously set forth by Applicants concerning the rejections based on Seppala, Hovenkamp-Hermelink, and Bathelaan. Applicants previously argued, and continue to argue, that no evidence has been put forth to support the notion that natural starches or polysaccharides have similar properties as the root or tuber starches having at least 95% wt. of amylopectin according to the invention.

On the bottom of page 4 of the office action, the Examiner has responded to the above argument by noting that "the only feature of the starch recited in the claims, other than its source, is the amylopectin content." Therefore, according to the Examiner, the burden is on the Applicant to show a novel or unobvious difference between the claimed product and the products of the prior art.

Applicants provide the following to assist the Examiner in appreciating the novel and unobvious differences between the claimed hydrophobized, amylopectin root or tuber starch product and the starch products of the prior art.

Discussion Of The Striking Differences Among Starches Of Different Botanical Origin

Attached are copies of three documents that support Applicants' position that various starches having up to 100% amylopectin do not share similar properties and/or behaviors.

Frederiksson et al., Carbohydrate Polymers, 45 (1998), 119-134 disclose a comparison of a number of properties of wheat, rye, barley, waxy barley (having close to 100% amylopectin), high amylose barley, waxy maize, potato, amylopectin potato and pea starch.

With regards to the following properties, significant differences are reported: granule diameter, lipid content, crystallinity, phosphate content and chain length distribution. Of particular interest is the difference in chain length distribution. Amylopectin potato starch (APS) (which is a root or tuber starch as claimed in the present invention), has the highest fraction of long amylopectin unit-chains (35% compared to 24% in waxy maize and 21% in waxy barley starch).

Frederiksson et al. teach that having a high fraction of long amylopectin unit-chains is important for amylopectin retrogradation. The uniqueness of amylopectin potato starch (APS) is nicely depicted in figure 8a of the article in which the cereal starches are separated from the tuber starches and the amylose containing starches are separated from the amylopectin containing starches. APS has a unique position, leading to specific and unexpected advantages.

In Yoo et al., Carbohydrate Polymers, 49 (2002), 307-314, a comparison is described of amylopectin from 23 different sources in terms of molecular weight, gyration radius and density. From this study it is apparent that amylopectin from waxy maize has four times higher molecular weight, slightly higher gyration radius and consequently more than three times higher density of the amylopectin molecule than amylopectin potato starch.

Jane et al. J. Appl. Glycoscience, 50 (2003), 167-172, discuss various aspects of amylopectin and its granule structure based on an overview of relevant literature. The difference in branch structures between A-(cereal) and B-(tuber) crystalline starches are summarized on pages 167-168 and in figure 1. The structural differences between the cereal and tuber starches leads to different behaviors in the Naegeli (partial acid) hydrolysis process. Jane et al. also rephrase the molecular weight and density differences already disclosed by Yoo et al. and attempt to link these to different botanical origins of the starches.

In sum, it is Applicants position, which is supported by the above documents, that the behavior of starches of different botanical sources and having different amylopectin contents is unpredictable. Therefore, although the Examiner contends that the attachment of a hydrophobic group to a starch in general is known, one cannot predict what kind of rheological behavior the product would show, or which reagents would provide the most beneficial product. Hence, it would not have been obvious to one of ordinary skill to use a root or tuber starch having an amylopectin content of at least 95 %wt. in the claimed process.

The examples of the application illustrate highly unexpected and beneficial rheological properties of the hydrophobic root or tuber starches of the present invention. To the person skilled in the art there was no reasonable expectation of success in achieving such properties starting from Seppala, not even if supplemented by Hovenkamp and/or Bathelaan, or any other cited references,

In order establish a *prima facie* case of obviousness, one of the criteria to be met is that there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the teachings of the references

Nowhere in Seppala et al. or Batelaan et al. is there any disclosure or suggestion to replace the natural starch of Seppala et al., or the polysaccharide of Batelaan et al., with root or tuber starches having at least 95 wt.% of amylopectin.

Applicants herein have put forth evidence to support the idea that natural starches and polysaccharides do not have similar properties as root or tuber starches having at least 95 wt.% of amylopectin. Therefore, they are not interchangeable.

Since root or tuber starches having at least 95 wt.% of amylopectin and polysaccharides, such as natural starches, do not have similar properties, it would **not** have been obvious to replace the natural starches of Seppala et al. or to replace the polysaccharide of Batelaan et al. with root or tuber starches having at least 95 wt.% of amylopectin.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejections of claims 21-28 under §103(a).

Claims 29-34 have been rejected under §103(a) as being unpatentable over the combination of Seppala et al., Hovenkamp-Hermelink et al. and Bathelaan et al., as applied to claims 21-28, and further in view of U.S. Patent No. 5,563,251 to Lachocki and U.S. Patent No. 5,977,348 to Harris. Applicants respectfully disagree.

Claims 29-34 differ from claims 21-28 in that the hydrophobization is limited to etherification and esterification, wherein the reagent comprises a halide, halohydrin, epoxide, glycidyl or quarternary ammonium.

The Examiner recognizes that Seppala et al. does not disclose the reagents listed above. However, the Examiner contends that the selection of an appropriate hydrophobic reagent in a conventional process is seen to be well within the purview of the skilled practitioner.

Lachocki et al. has been cited as allegedly disclosing a process for reacting hydrophilic polyols with epoxy compounds. Harris has been cited as allegedly disclosing the use of various derivitizing agents to modify starches.

Applicants respectfully disagree with the Examiner. The claimed process is not conventional because the starch used possesses unique characteristic and behaviors. One of ordinary skill would not have been motivated to select the claimed reagents for use in the process of Seppala et al. based on the teachings of Lachocki and/or Harris.

Applicants have presented evidence that a *prima facie* case of obviousness does not exist. However, if the Examiner is still not persuaded that it would not have been obvious to replace the natural starches of Seppala et al., or to replace the polysaccharide of Batelaan et al. with root or tuber starches having at least 95 wt.% of amylopectin, or to use the specific reagents claimed, Applicants have added new claim 35.

Applicants have added new claim 35, in Jepson format, in an attempt to move the application towards allowance.

In view of the foregoing amendments and remarks, applicants respectfully submit that the application is now in condition for allowance and is earnestly requested. If the Examiner believes that a discussion with Applicants' representative would be of assistance, he is invited to contact the undersigned.

Respectfully submitted,

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